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## SOME JESUIT INFLUENCES UPON OUR NORTHEASTERN FLORA.<sup>1</sup>

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THE canoeman who makes camp at night or lands for his mid-day meal by the St. John or the Restigouche must observe how different are the plants about him from those with which he is familiar at home. Even those who in town lay no claim to botanical knowledge are impressed by the large proportion of unfamiliar wild flowers; while, to those who concern themselves primarily with such matters, the vegetation of the upper St. John has been, since the return of its first botanical explorer, a constant source of problems. The scores of plants unknown elsewhere in New England are not alone, however, in furnishing puzzling questions for the student of botanical geography, for on the gravelly shores with these unique northern plants are seen in great profusion many species which, about our cities and towns, are every-day roadside weeds. A returning canoeman whose eyes are ever open to the vegetation about him has recently written: "One of the last plants that we saw on the borders of the Grand River settlement was the campion-flower (*Silene Cucubalus*). It was the first to attract our attention on the pebbly beaches of the Restigouche. It was almost constantly in sight on the whole course of the river. And yet it is not a native plant, but introduced on this continent from the Old World where it occupies wide areas from North Africa and India to the Arctic Ocean. It has evidently followed the footsteps of man, both as settler and explorer, for it is as abundant on the upper St. John as on the Restigouche."<sup>2</sup>

<sup>1</sup> Slightly modified from a paper read May, 1897, before the Natural History Society of New Brunswick.

<sup>2</sup> G. U. Hay; The Restigouche — with notes especially on its flora (Bull. Nat. Hist. Soc. N. B. xiv. 18).



As I have wandered along the gravelly beaches of the St. John and the Aroostook or have paddled through the calm lakes and whirling rapids of the St. Francis, this point has often set me wondering how to tell a really indigenous plant. For, wherever I have been on the St. John waters, the main St. John as far as the Little Black, or up the Aroostook and the St. Francis, the campion has always appeared in great masses, covering the gravel with its slender spreading gray-green stems and everywhere developing a wonderful profusion of white flowers tipped by purple anthers. Such stretches of airy white are among the most attractive features of these shores, for here the campion has lost the weedy appearance which we ordinarily associate with it and has assumed that untamed beauty and vigor which have so unspeakable a fascination for those who follow the northern rivers. Here along the cool shores the campion often mingles its clear white with the varied blues of the milk-vetch (*Astragalus alpinus*) or perhaps spreads its slender stems among the misty gray plumes of the Huronian tansy (*Tanacetum huronense*). Often, too, a patch of silver-weed (*Potentilla Anserina*) has crept in among the campion, here and there displaying the wonderful sheen of its yellow flowers, while a flash of white from its leaves tells that a stray breeze has crept up the stream.

In northern Maine and New Brunswick the campion is not restricted, however, to the rivers already named. During the scientific survey of 1861, Professor Goodale saw it on the Allaguash, and it is said to grow at Mirimichi and Richibucto. Nor is this plant limited in its riparian distribution to northern Maine and New Brunswick. It has been noted in Quebec, at Notre Dame du Lac on Lake Temiscouata, the chief source of the Madawaska river; it is said to be abundant with colt's foot on mountain streams in northern Vermont; and Professor John Macoun, the distinguished government naturalist of Canada, states that on the lower St. Lawrence it is found in the greatest profusion. In fact, almost a century ago it was detected on the St. Lawrence by the elder Michaux, sent to America by the French government in search of trees useful in the arts, though from his note, "in Canada, circa *Quebec* et loca habitata," one would assume that the plant was there introduced.

Excepting this northeastern colony of the campion, we have no indication that the plant is indigenous in America. It is common, to be sure, in many parts of Canada and the eastern states, but, wherever



it occurs in thickly settled regions, it is apparently of recent introduction from Europe, and its behavior is that of a weed. It delights, under such circumstances, in monopolizing waste places and roadsides, but it is rarely found along water-courses. In "the Aroostook"<sup>1</sup> and Madawaska,<sup>2</sup> on the other hand, it is very unusual to find the campion growing along roadsides or in the neighborhood of dwellings: personally I have seen it under such conditions only once and that was by the railroad at Fort Fairfield.

Another European plant which one sees everywhere along the St. John is the mugwort (*Artemisia vulgaris*). In 1861, Professor Goodale called attention to this, expressing surprise that, at the mouth of the Madawaska and at the Grand Falls, it was found on rocks with the native species (*A. canadensis*). But for some reason this is the habitat of the mugwort through the entire Madawaska region. Here it prefers the gravelly thickets, where, with its dissected foliage of dark green and white and its elongated, dusty-white spires, it makes a striking companion for the goldenrods and asters; and further north, at Notre Dame du Lac, it abounds in the thickets of raspberry, elder, and other indigenous shrubs. But in eastern America the mugwort is generally an introduced plant and, like the campion, has taken possession of many rubbish heaps and old fields. It should be noted, however, that, on Hudson Bay, the very form which grows on the St. John is considered indigenous; and that early in this century both Michaux, the French explorer, and Pursh, whose short brilliant career was so full of pathetic romance, regarded our own plant as native, for, in the words of the former it was found "in septentrionalibus Canadaë," and by the latter it was seen "on the banks of rivers; Canada to New England."

Many other European plants, less abundant on our northern rivers than the campion and the mugwort, should probably be considered with them. Among these are the field sow-thistle (*Sonchus arvensis*) and one of the hawkweeds, for the present considered a form of *Hiera-*

<sup>1</sup> "The Aroostook," a general name, in Maine, for the section drained by the Aroostook river and its tributaries; and, by extension, also applied to the country drained by smaller branches of the St. John as far south as the Meduxnakeag.

<sup>2</sup> Madawaska, that portion of Maine and New Brunswick drained by the St. John between the Grand Falls and Little Black river. The name, derived from Madawaska river, originally designated the settlement at its mouth, but is now applied to all the Acadian-French district of northern Maine and New Brunswick.



*cium vulgatum*. Early in this century the sow thistle was seen in Newfoundland, and in their recent explorations on that island, Dr. Benjamin L. Robinson and his companion, Hermann von Schrenk, found it on "gravelly banks in Salmonier River, exclusively with native plants as if indigenous." In northern Maine, too, this plant grows in just such situations. It is tolerably common on the St. John from the St. Francis, where it grows on gravelly banks with the alpine cinquefoil (*Potentilla tridentata*), to the mouth of Violette brook, where, at Van Buren, it abounds with such species as the Huronian tansy, the spurred-gentian, and the ever-present campion and mugwort. Unlike the latter species, however, the field sow-thistle, in its apparently native range in Maine, is not restricted to the St. John waters. It is locally abundant on the calcareous-slate cliffs and the gravelly shores of the Piscataquis in north-central Maine, growing luxuriantly by a water-fall with native shrubs and herbs. About Bras d'or Lake in Cape Breton, too, it is one of the commonest and most beautiful plants. When warned by the government botanist that they should eradicate what might quickly become a pest, the settlers replied that to them and their grandfathers the plant had always been known as a harmless species confined to the lake-shore. Yet this same sow-thistle, like the campion and the mugwort, is, in southern New England, a frequent weed by roadsides and in cultivated fields, where it has been recently introduced from Europe.

The hawkweed (*Hieracium vulgatum*), so far as known, has shown little tendency, like its cousins the orange hawkweed and the famous king-devil weed, to court civilization. Wherever found in the north it has been on shores or rocky banks, and not in cultivated or thickly settled regions. It grows on the Labrador coast, and according to Professor Macoun it is "frequent along river margins on Anticosti, and along the Gaspé coast from Cape Rosier to Matane; also on the heights of Point Levis. . . . It is probable that this species is common on both sides of the Lower St. Lawrence and along the shores of the gulf. It is certainly indigenous." In Newfoundland, Robinson and von Schrenk report it "in crevices of rocks by swift streams and waterfalls; Holyrood, and the cataracts of the Rocky river . . . to all appearances indigenous." In Maine the plant is rare, but on the Piscataquis river a form identical with the Newfoundland plant occurs, with the bird's-eye primrose (*Primula mistassinica*), the bladder-fern, and other strictly indigenous plants, in the crevices of wet cliffs near a



water-fall. Seventy miles to the northeast, at Island Falls on the Mattawamkeag river, at the foot of the rocky island, which, with the falls above it, has furnished the name for a prosperous young town, the spray-showered ledges are bright with the alpine bilberry (*Vaccinium caespitosum*), Kalm's lobelia, and this hawkweed; and below a wild fall in the Penobscot, not far from the Indian village at Oldtown, the plant abounds in a similar situation.

Along the northern rivers and shores, then, from Labrador and Newfoundland through Gaspé and eastern Quebec and thence south into New Brunswick and Maine, there are these common European plants, most of which are more or less introduced into the thickly populated regions as roadside weeds. Observers and authors have treated these plants in various ways. As already noted, Michaux and Pursh doubtless considered the mugwort native, and Asa Gray says it is "apparently indigenous at Hudson's Bay, etc.," though south of that region he considered it only an introduced plant. The campion, save on a few herbarium-labels, is nowhere recorded as indigenous. The field sow-thistle has usually been treated as an introduced weed, but, on the other hand, the hawkweed is pretty generally accepted as native. It must seem quite clear that, if the mugwort and the hawkweed are native plants, the campion and the field sow-thistle, growing with them or under the same conditions, must likewise be so regarded.<sup>1</sup>

Here, though, we encounter the question, what is an indigenous plant? In the Old World, where through ages the mingling of races has spread many plants from one end of the continent to the other, this must often be an unanswerable question; but in our own country there is at least one criterion, that of history, which may generally be applied. It is true that in the broadest sense we may not say what is native, for through the geological ages there has been a constant shifting of life from one place to another; and even to-day we may

<sup>1</sup> Other species of the same or more restricted range are seemingly indigenous, for example: *Ranunculus hederaceus* along Quiddy-Viddy Lake, etc., and *Nardus stricta* and *Triodia decumbens* on Rennies River, Newfoundland; *Tussilago Farfara* on river-banks, even well among the mountains, northern New England; *Achillea Ptarmica*, which "looks like a native at River Charlo, Restigouche Co., and Kouchibouguac, Kent Co.," New Brunswick; *Gnaphalium sylvaticum*, by streams, on muddy banks, and in clearings, northern Maine, New Brunswick and Cape Breton; and *Veronica arvensis*, in springy spots along the Aroostook and the Penobscot rivers. These and several others not here listed may have had the same origin as the northeastern colonies of campion, etc.



readily see the sudden appearance of wind-spread plants, like the fringed-gentian, in spots where they have hitherto been unknown ; or, on our own St. John river, each spring we may see a wonderful washing down of species from the upper valleys to the rich basin of Kennebecasis Bay. The Indians, too, in their centuries of travel spread hundreds of species, long before we could take any account of them. Nevertheless, admitting such exceptions, we may fairly say that if the plant has not come to its present position through the direct or indirect influence of historic man, it is indigenous, otherwise it is introduced.

How about the plants in question ? It is well known, as we have already seen, that, in thickly settled regions of America, at least three of these plants are known to be of European origin ; but so are many other species, yarrow, plantain, etc., which are likewise undoubtedly indigenous in the northern parts of our continent. And there are scores of species, common like the campion, mugwort, field sow-thistle, and hawkweed in northern Europe, which are certainly indigenous in America. Among these are the bog bilberry (*Vaccinium uliginosum*, the rock cranberry (*V. Vitis-Idaea*), the yellow-rattle, (*Rhinanthus*) and the eyebright (*Euphrasia*), all of which (excepting a few coast and mountain stations) have in the east the same southern limit of distribution as the plants which are especially under discussion.

When, however, we look into their broad range in America, a significant fact appears. The yellow-rattle, for instance, grows in Labrador, Newfoundland, northern New Brunswick and Maine and in the White Mountains, on the New England coast, the northern shore of Lake Superior, in the Rocky Mountains, and thence north to Unalaska and the Arctic coast. Such in general is the range of all the plants which, coming from the north, reach in eastern America the same southern limit as the campion and its associates. The study of this peculiar distribution is one of the most important and fascinating problems for the northern botanist, but it must not now be allowed to take us far from the main subject. In this discussion we may accept without question the well-proved hypothesis that, prior to the glacial period, these plants were common in the circumpolar regions. As the glacial period came on the ice crept further and further equatorward and gradually drove all forms of life nearer the tropics. In time, when the ice-sheet covered New England, of course no plants could live here ; but, as the ice melted away, those species which had



formerly adapted themselves to live near it found the proper conditions for their growth moving northward. Accordingly, as the ice receded further and further, these plants reproduced themselves and attained their greatest development more to the north than before. They were closely followed in their migration by others which required somewhat less arctic conditions, until a very general northward movement was made by all the plants crowded during the glacial period into the southern half of our hemisphere. The time has long since passed when the arctic species in their poleward march covered New England, the region of the Great Lakes and of the Rocky Mountains. But on the higher mountain-summits, on sheltered rocky shores, and on fog-enshrouded coasts these plants seem to have found congenial conditions; at least, on the upper Rockies and the White Mountains, on the northern shore of Lake Superior, on the eastern coast of New England, and in cool, sheltered spots in the interior, they have persisted as isolated remnants of a flora which once covered all the country about us, but which is now of general occurrence only in the far north.

Through continental Europe and parts of Asia, the campion, mugwort, field sow-thistle, and hawkweed are very common, and they even extend north to the Arctic Ocean. It would seem natural, then, that, if they were to be grouped with the other European plants, the yellow-rattle, etc., which have a similar range south of the St. Lawrence, we should find them throughout Arctic America, on the Great Lakes and in the Rocky Mountains. But this is not the case: the most northern recorded station seems to be that of the mugwort on Hudson Bay; and there are no records, as far as we know, for any of the four plants on our Arctic coast or in the Rocky Mountains. Considering, then, their very restricted range in America, it is probable that these plants were at some time introduced; but there are no available historic records by which this can be proved. There are surely no large towns in the forests of Maine, New Brunswick and Quebec, and it does not really seem probable that plants have been brought to the shores of our northern rivers through the means by which they ordinarily reach our city streets and waste places — the importation of foreign goods and the constant shipping from one place to another of packing in which the seed may have lodged.

The early history of the country through which these plants are found suggests, however, a possible explanation. In 1534, Jacques Cartier entered the Strait of Belle Isle and found French fishermen



already somewhat familiar with the Gulf of St. Lawrence. Winter quarters were established in 1535 near the present site of Quebec; and from this time the banks of the lower St. Lawrence were more and more visited by Europeans. At the end of the sixteenth century Newfoundland was already the scene of extensive fishing operations; and in a single season its waters were visited by three or four hundred fishing vessels, and more than a hundred habitations were built upon the island. Prior to 1600 the French had carried on explorations along the St. Lawrence; and from the days of their earliest settlements the Jesuit missionaries rapidly pushed into the entire country from Labrador, Newfoundland and Nova Scotia west to the Great Lakes. They early spread from the St. Lawrence through the northern wilderness to Lakes St. John and Mistassini and to Hudson Bay; and they very soon made their way to the Indian villages on the St. John, the Penobscot and the Kennebec.

Coming as they did from a thickly populated section of Europe where the campion, the mugwort, the field sow-thistle and the hawkweed are common plants — and it should be noted that the seeds of all these plants are provided with means for clinging to garments or anything with which they are brought in contact — it would be a most natural thing for the French, consciously or unconsciously, to bring with them a few seeds of these species. It would further surprise no one, who has seen the campion overrun the fields about Boston and Cambridge, that these plants should soon have established themselves along the St. Lawrence, whose current would greatly increase the rapidity with which they spread along its shores. And then it is certainly probable that, in their extensive travels from Quebec through to the northern country, or south into New Brunswick, Maine, or Vermont, the Jesuits carried with them a few clinging seeds of these plants. The singular point is that the campion and the mugwort do not grow in abundance on the shores of the Penobscot and the Kennebec; though on the latter river there is a small patch of campion on a gravelly bank at Carritunk, forty miles above the old Indian village at Norridgewock, where Sebastian Ràle so long had his ill-fated mission, but there it is evidently of recent introduction. This absence of the plants from the Penobscot and Kennebec shores may be due to the fact that, though the Jesuits came through from the St. Lawrence to these waters, the seed, which at first would have adhered to their clothing or rough blankets, would have been thoroughly brushed off after a few days



voyage on the St. John. Once started, however, on that river or its tributaries, it would require only a few years for such plants to gain a firm footing along the entire valley.

It will be remembered that the hawkweed (*Hieracium vulgatum*) is generally found in the neighborhood of water-falls and that the field sow-thistle, likewise, is apt to grow in similar places. Compared with the campion and the mugwort, neither of these plants produces many seed — the hawkweed rarely has more than a single clear-yellow head. May it not be that these plants were established in such spots by the voyageurs, who, when they came to the falls, would, in making the portage, shake out or at least disturb their blankets; and, though long established, the plants have never spread far, like the campion and the mugwort, because of their smaller number of seed?

Beside the original voyageurs and the river currents, there are other factors which have doubtless had a large share in the spreading of plants on the St. John. Reference is made to the Acadian settlers of the Madawaska region, and likewise to the modern canoeman and river-driver, though compared with the Acadians, their share has been a small one. The upper St. John valley from the Grand Falls to the Allaguash was long ago settled by Acadians. These people were largely those who came up the river after the pathetic expulsion of 1755. For a century and a half they have passed their simple outdoor lives in comparative isolation. During most of that time their chief means of conveyance have been various forms of bateaux; and even now, with railroads rapidly tapping the country, many a solitary farmer from the St. Francis, the Allaguash, or the region toward Seven Islands annually fills his "dug-out" with oats or buckwheat and floats down stream to the mill at Fish River (Fort Kent of the Yankees). The constant travel of these people is the most effective means of spreading plants from the mouths toward the sources of the streams.

In this discussion little attention is paid to the early voyages of the Northmen, of John and Sebastian Cabot, of Gaspar Cortereal, of the Portuguese fishermen and their contemporaries early in the sixteenth century. They may have brought to this continent plants of European origin; but their cruising was chiefly along shore, and their settlements, when made, were only small and temporary, so that it is doubtful if they materially influenced the character of our northern flora. At any rate, there is nothing to suggest that they brought to us the four plants we are considering.



It is probable, however, that, though appearing indigenous on our northern waters, the campion, the mugwort, the field sow-thistle and the hawkweed are to be looked upon as European plants long ago introduced by the Jesuits. And just as about our cities and towns they often spread along highways, following the advance of commercial intercourse, they have become thoroughly scattered and established on the northern streams — the natural highways of the voyageur, the Acadian settler, the modern canoeman and the river-driver. If this be the true explanation, we should expect to find them on any of the rivers, the Saguenay, the Chaudière, and the Richelieu, for example, which are more or less directly confluent with the St. Lawrence. They are to be expected, in fact, on any stream which was followed by the Jesuits.

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DAPHNE MEZEREUM IN VERMONT. — I wish to record in RHODORA a very attractive addition to our Vermont flora, *Daphne Mezereum*, Linn. The daphne is, of course, not uncommon in gardens. In Gray's Manual it is stated that it escapes from cultivation in Massachusetts and New York, but it is not recorded from northern New England. I find it scattered over several square rods of a wooded ledge near Burlington, Vermont, and in one place forming quite a thicket. Some of the stems are an inch in thickness, showing that they have been there for years. The plants flower and fruit abundantly, and seedling plants are very numerous. I have also received the daphne this spring from a correspondent in North Montpelier, Vermont, who reports it as a "wild flower" there. Doubtless it occurs in many places in the State, but has hitherto escaped record. — L. R. JONES, University of Vermont.

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## CRITICAL NOTES ON THE NEW ENGLAND SPECIES OF LAMINARIA.

WILLIAM ALBERT SETCHELL.

(Conclusion.)

TAKING the various characters enumerated into consideration, the New England species of Laminaria may be arranged and characterized as follows: —